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(71) Applicant and

(72) Inventor: TAN, Min [US/US]; 3707 Poinciana Drive,
#112, Santa Clara, CA 95051 (US).

(74) Agents: MALLIE, Michael, J. et al.; Blakely, Sokoloff,
Taylor & Zafman LLP, 7th floor, 12400 Wilshire Boule-
vard, Los Angeles, CA 90025 (US).

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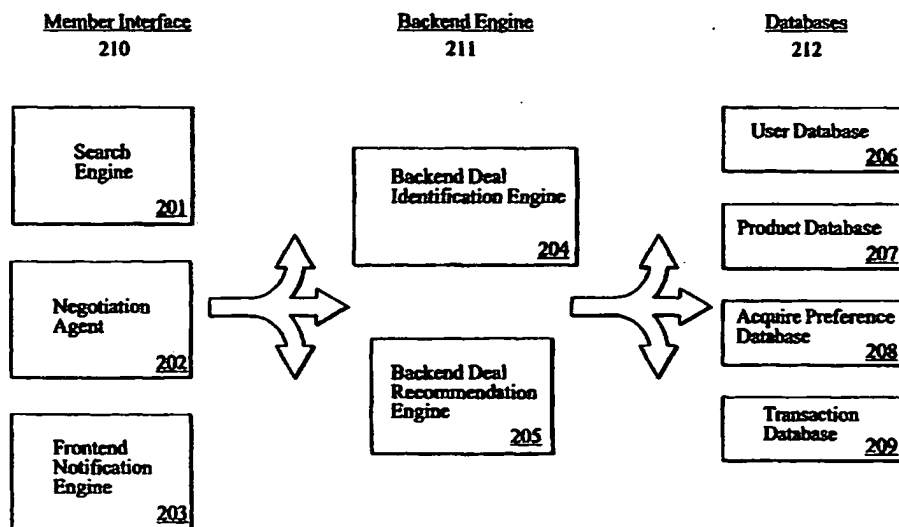
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(54) Title: AUTOMATED NEGOTIATION AND TRADE DEAL IDENTIFICATION IN SALE AND EXCHANGE BASED TRANSACTIONS

Block Diagram for System Implementation



(57) Abstract: Automated negotiation in an on-line environment is described. In one embodiment, the method comprises an automated negotiation agent (202) receiving, over a networked environment an indication of a product to be acquired (208) for an individual, the automated negotiation agent (202) negotiating for the product over the networked environment on behalf of the individual, and completing a transaction as a result of the negotiation of the automated negotiation agent (202).

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AUTOMATED NEGOTIATION AND TRADE DEAL IDENTIFICATION IN SALE AND EXCHANGE BASED TRANSACTIONS

This application claims the benefit of U.S. Provisional Application No. 60/157,318 filed October 1, 1999.

FIELD OF THE INVENTION

The present invention relates to the field of negotiation in sale and exchange based transactions; more particularly, the present invention relates to using an automated negotiation mechanism to facilitate exchange based and other types of transactions.

BACKGROUND OF THE INVENTION

A valuation method is a particular process of determining the value, in units of a commonly accepted currency, of a trade item. Until now, electronic commerce has been limited to cash-based transactions involving fixed-price based valuation or auction-based valuation methods for goods and services to be exchanged for a suitable amount of cash between two parties. Fixed-price based valuation involves the process of seller setting a fixed price to each of the trade items, based on seller's profit goal and perception of market need. Auction based valuation involves the process of a time-limited auction period where potential buyers bid against each other with the goal of getting the trade item with the winning bid which is the highest bid among all bidders. Therefore, in auction based valuation, the valuation depends on buyers' perception of the trade item value and on bidding dynamics.

Another type of valuation technique is negotiation-based valuation. Negotiation-based valuation involves the process of buyer and seller engaging in rounds of negotiations to determine the price of a trade, with the goal to reach a price with which both the seller and the buyer are comfortable.

Trade-based transaction, or barter as it is commonly known, hasn't yet become a popular or successful online exchange form.

Traditional exchange activities (a barter-dollar based scheme used by local barter clubs and exchange companies) are restricted in its flexibility and efficiency by:

(1) The exchange database for searching potential buyers and sellers of various goods and services has limited accessibility, usually to a local exchange community or to members of a particular barter exchange club;.

(2) Exchange listings are brief and non-informative, since it is expected that most of the information gathering and negotiation activities are to be conducted between two parties of a potential exchange;.

(3) Exchange listing search capability is usually limited to board postings, newsletter updates, and in few cases custom computer-based search tools requiring a user to be physically on-site to access the database; and

(4) Double coincidence of wants: A seller cannot sell goods and services to an interested buyer unless the seller is also interested in what the interested buyer has for sale.

SUMMARY OF THE INVENTION

Automated negotiation in an on-line environment is described. In one embodiment, the method comprises an automated negotiation agent receiving, over a networked environment, an indication of a product to be acquired for an individual, the automated negotiation agent negotiating for the product over the networked environment on behalf of the individual, and completing a transaction as a result of the negotiation of the automated negotiation agent.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be understood more fully from the detailed description given below and from the accompanying drawings of various

embodiments of the invention, which, however, should not be taken to limit the invention to the specific embodiments, but are for explanation and understanding only.

Figure 1 is a flow diagram of one embodiment of a transaction according to the present invention.

Figure 2 is a block diagram of one embodiment of a negotiating system.

Figure 3 is a block diagram of one embodiment of a network environment.

Figure 4 is a block diagram of one embodiment of a computer system.

Figure 5 is an exemplary negotiation agent customization interface.

Figures 6 – 14 is a block diagram of one embodiment of a web site.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

Automated negotiation and trade deal identification processing is described. In the following description, numerous details are set forth, to provide a thorough understanding of the present invention. It will be apparent, however, to one skilled in the art, that the present invention may be practiced without these specific details. In other instances, well-known structures and devices are shown in block diagram form, rather than in detail, in order to avoid obscuring the present invention.

Some portions of the detailed descriptions which follow are presented in terms of algorithms and symbolic representations of operations on data bits within a computer memory. These algorithmic descriptions and representations are the means used by those skilled in the data processing arts to most effectively convey the substance of their work to others skilled in the art. An

algorithm is here, and generally, conceived to be a self-consistent sequence of steps leading to a desired result. The steps are those requiring physical manipulations of physical quantities. Usually, though not necessarily, these quantities take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared, and otherwise manipulated. It has proven convenient at times, principally for reasons of common usage, to refer to these signals as bits, values, elements, symbols, characters, terms, numbers, or the like.

It should be borne in mind, however, that all of these and similar terms are to be associated with the appropriate physical quantities and are merely convenient labels applied to these quantities. Unless specifically stated otherwise as apparent from the following discussion, it is appreciated that throughout the description, discussions utilizing terms such as "processing" or "computing" or "calculating" or "determining" or "displaying" or the like, refer to the action and processes of a computer system, or similar electronic computing device, that manipulates and transforms data represented as physical (electronic) quantities within the computer system's registers and memories into other data similarly represented as physical quantities within the computer system memories or registers or other such information storage, transmission or display devices.

The present invention also relates to apparatus for performing the operations herein. This apparatus may be specially constructed for the required purposes, or it may comprise a general purpose computer selectively activated or reconfigured by a computer program stored in the computer. Such a computer program may be stored in a computer readable storage medium, such as, but is not limited to, any type of disk including floppy disks, optical disks, CD-ROMs, and magnetic-optical disks, read-only memories (ROMs), random access memories (RAMs), EPROMs, EEPROMs, magnetic or optical cards, or any type of media suitable for storing electronic instructions, and each coupled to a computer system bus.

The algorithms and displays presented herein are not inherently related to any particular computer or other apparatus. Various general purpose systems

may be used with programs in accordance with the teachings herein, or it may prove convenient to construct more specialized apparatus to perform the required method steps. The required structure for a variety of these systems will appear from the description below. In addition, the present invention is not described with reference to any particular programming language. It will be appreciated that a variety of programming languages may be used to implement the teachings of the invention as described herein.

1. Overview

The online exchange environment described herein provides an online environment for trade-based transactions as well as cash-based transactions utilizing various valuation methods to suit seller and buyer needs.

Figure 1 is a flow diagram of a process for performing a trade-based transaction. The process is performed by processing logic that may comprise hardware (e.g., dedicated logic), software (such as that which runs on a general purpose computer or a dedicated machine), or a combination of both.

Referring to Figure 1, members initially list their products for exchange (processing block 101). After listing their products for exchange, members specify what they would like to exchange for (processing block 102). Once the members have specified what they would like to exchange for, members specify the valuation of the products that they want to exchange for (processing block 103). Subsequently, an acquire preferences database is constructed (using the information specified in processing block 102) (processing block 104).

The processing logic searches for potential barter deals in the database (processing block 105). In one embodiment, computer programs on servers perform the search.

Next, processing logic checks whether each barter deal satisfies the cash layout limit set by each member (processing block 106). In one embodiment, computer programs on servers perform the check.

Each user receives an item and sends out an item in an exchange deal. Those two items may have different values. Members may pay cash to compensate that difference. In one embodiment, each user can specify a maximum amount of cash that he/she wants to use in terms of the percentage of the total trading value while listing the items. A deal identification engine verifies this user specification and only enforces the deals that meet those cash layout limit. For example, if a user specifies this amount at 10% for a used computer, and the final valuation of that computer is \$300. Then, that user doesn't want to pay more than \$30 cash in an exchange, and the maximum value of an item that user can receive is $\$330 = \300 (value of the used computer) + \$30 (cash layout limit). The deal identification procedure keeps this in mind and only presents that user the deal that satisfies this limit. For item listing with multiple quantities, this percentage is per item based on the per item valuation.

Lastly, processing logic informs the corresponding members about their pending barter deal (processing block 107).

2. Valuation Methods

In one embodiment, the exchange environment may support at least the following three kinds of online valuation methods: fixed-price based valuation; auction based valuation; and negotiation based valuation.

In one embodiment, for fairness and transaction control, a trade item can only be associated with one valuation method at a given time. For auction-based valuation, the associated trade item cannot switch to another valuation method during the auction period.

2.1 Fixed-Price Based Valuation

The online exchange environment may support this valuation method by providing the capability for a seller to associate a trade item with a fixed price.

In one embodiment, sellers set that fixed price when they list their items through a web interface. In such a case, they may simply input a fixed amount in the fixed price text field of the graphic user interface.

2.2 Negotiation Based Valuation

The negotiation-based valuation method involves the process of human-human, human-computer, or computer-computer negotiation between a potential buyer and a seller. In one embodiment, for very complicated products or services, this system provides an online approval form for buyers and sellers to fill out after their off-line negotiation process.

In one embodiment, the online negotiation-based valuation agent makes human-computer and computer-computer negotiation possible to support an alternative valuation method other than the commonly available auction-based valuation or fixed-price based valuation for electronic commerce.

The online negotiation-based valuation agent, using well-known artificial intelligence and statistical analysis technologies, provides customized computer negotiation agents (e.g., negotiation agent 202 of Figure 2) for seller and/or buyer. A customized computer negotiation agent tries to mimic human negotiation approaches with a goal of striking a very good deal and/or the best deal for seller or buyer.

In one embodiment, based on product details that may include: cost, condition, availability, perceived market value, and other financial/market factors, a seller or a buyer can customize a negotiation agent to negotiate an acceptable value at which a seller is willing to sell and a buyer is willing to buy an item, for:

- (1) one product (single item);
- (2) one product with quantity (multiple items); and

(3) multiple products with quantities (single and/or multiple items per product).

Given one or more products or one or more products with quantities, a seller or a buyer uses the online negotiation agent customization interface to provide negotiation parameters such as, for example, reservation price, starting offer price, and maximum offer price. For example, for a single item listing, one gives two parameters, one's reservation price (i.e., the lowest acceptable price for which one will sell or exchange the item, this price is unknown to other users) and an offering price (i.e., the price shown on your page listing as the starting point for negotiation). An example of the user interface to add an item to a listing is shown in Figure 5.

In one embodiment, for multiple quantity item listing, one indicates (1) minimum quantity for sale/exchange (e.g., at least 5 T-shirts or 3 hours of babysitting service), (2) maximum quantity available (e.g., total 100 T-shirts or 20 hours of babysitting service), (3) for the minimum quantity, reservation price per item P_{min} and (4) offering price per item (e.g., if other member only wants 5 T-shirts or 3 hours of babysitting service). The offering price and the minimum quantity comprise the initial offer shown on one's item listing page as the starting point for negotiation. Also, needed is an indication of, (5) for the maximum quantity, its corresponding reservation price per item P_{max} (e.g., if the other member wants all 100 T-shirts or 20 hours of babysitting service, what is the lowest acceptable price). In one embodiment, P_{max} cannot be larger than P_{min} . Thus, in this embodiment, there are a total of 5 parameters.

For example, if one has a total 45 well-crafted dinning room lamps for sale or exchange. At least 5 lamps in one sale/exchange at \$110/per lamp. For all 45 of them, reservation price is \$95/per lamp. Thus, $P_{min} = 110$ and $P_{max} = 95$. Then, the offering price for 5 lamps is \$135/per lamp, and this is the starting price and quantity other users will see. An intelligent negotiation agent will be set up based on the above 5 parameters. When the trading partner specify a

quantity between 5 and 45, for example 25, the negotiation agent extrapolates a reservation price for this particular quantity, in this case \$100 (between \$95 and \$110). This eliminates the time necessary to tell the agent about the reservation price for each quantity between 5 and 45. Also, this estimated reservation price gives the negotiation agent a guideline throughout the negotiation process for a different quantity that the end trader wanted to purchase or exchange for.

Once customized, the seller-side negotiation agent negotiates with a potential buyer (or buyer-side negotiation agent) when the buyer needs to negotiate with the seller for a fair market value the buyer is willing to pay. The buyer-side negotiation agent negotiates with a seller (or seller-side negotiation agent) to determine the fair market value. Typically, a seller-side negotiation agent negotiates with a human (a potential buyer) in a people-to-people or business-to-people trading scenario, whereas a seller-side negotiation agent negotiates with a buyer-side negotiation agent in a business-to-business trading scenario. However, the presence of seller and buyer side negotiation agents makes other trading scenarios possible as well.

One embodiment of the processing performed by a sell negotiation agent is depicted in psuedo code below:

Pseudo Code for Seller Negotiation Agent

Procedure Initialization() {

Set_Value (Input Parameters: seller's offer price and reservation price)

Set_Value (Utility function: buyer's price for single item product)

Set_Value (P: Probability distribution function of buyer's reservation price)

```
{
    Set to be uniform distribution between 0 and seller's offer price;
}
```

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Set_Value (Cp: Conditional probability distribution function of buyer's reservation price based on buyer's current offer price)

Set to be any probability distribution function between buyer's current offer price

and seller's offer price (e.g., uniform distribution);

(Note: any specific implementation is characterized by this choice)

Set buyer's current offer price to vary between 0 and seller's offer price;

}

Procedure *Negotiation()* {

If Buyer rejects the current seller offer price

Then *End negotiation*

If Buyer accepts the current seller offer price

Then *End negotiation and record the final deal*

If Buyer gives a buyer's final offer

Then {

If Buyer's final offer price \leq seller reservation price

Then Accept offer

Else Reject Offer and End Negotiation

 }

If Buyer gives a counter-offer

Then {

 Use standard Bayesian updating rule to update probability distribution function of buyer's reservation price P based on buyer's current offer price,

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previous function P , and C_p ;

(See P.21 of Casella and Berger reference, listed below, for Bayesian updating rule)

Calculate buyer's mean reservation price based on new P ;

(See P.54 of Casella and Berger reference, listed below, for mean value of a probability distribution function)

If Buyer's mean reservation price \leq Seller's reservation price

Then Decrease seller's offer price with a small amount ()

Else {

If Buyer's mean reservation price \leq previous estimate

Then Decrease seller's offer price with a medium amount ()

Else Decrease seller's offer price proportionally ()

}

Output (Seller's new offer price)

}

}

Decrease seller's offer price with a small amount () {

Make the probability distribution function of buyer's reservation price P to be unchanged;

Choose a random amount between previous estimation of buyer's reservation price and seller's

current offer price;

Decrease seller's offer price by that amount;

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}

Decrease seller's offer price with a medium amount () {

Choose a random amount between the current estimation of buyer's
reservation price and seller's
current offer price;

Decrease seller's offer price by that amount;

}

Decrease seller's offer price proportionally () {

Calculate the difference between previous and current buyer's offer price;

Decrease seller's offer price by a random percentage (e.g., 75% to 100%) of
the above difference

}

main negotiation_agent () {

Initialization ()

While current number of negotiation round < maximum rounds allowed

{

If time elapsed in this round <= maximum thinking time
allowed

Then Negotiation ()

}

}

References: See George Casella and Roger L. Berger, *Statistical Inference*, Wadsworth & Brooks/Cole Advanced Books and Software, Pacific Grove, California, 1990.

In one embodiment, as an alternative, after failed negotiation (e.g., buyer's final offer price is smaller than seller's initial reservation price), buyer can submit a sealed offer. A sealed offer is an extension of negotiation, in which a potential buyer or trader for exchange gives one offer without further negotiation process. The poster of an item will compare this offer with his/her reservation price. If the offer price is larger or equal to that reservation price, then the sealed offer is successful; otherwise that offer is discarded without having a counter-offer, as in negotiation. Sellers also can validate any sealed offers by reviewing all failed ones after comparing them with the reservation price automatically by the system.

2.3 Auction Based Valuation

In one embodiment, the online exchange environment supports this valuation method by providing the capability for a seller to associate a trade item with the auction based valuation method to sell or exchange the trade item. However, due to the fact that common auction process deals with cash-based transactions while an online exchange environment described herein deals with both cash-based and trade-based transactions, the auction-based valuation method used in the online exchange environment herein involves additional rules and restrictions in order to support trade-based exchanges.

Traditional auctions are effective in cash-based transactions where cash payments have a universally recognized face value. In trade-based transactions, however, the payment itself is in the form of goods or services, which require a separate valuation process. For online trade-based transactions, the separate

valuation process to determine payment value adds to the complexity of the auction valuation process and requires special attention.

In one embodiment, auction-based valuation has the following operations involved:

(1) A seller uses an auction-based valuation method to obtain the best price for goods or services to be sold.

(2) A seller uses a negotiation-based valuation method to negotiate with a potential bidder's negotiation agent for the value of goods or services to be received as (partial) payment if the potential bidder bids and wins the auction.

(3) A seller extends a bidding invitation to a potential bidder once the seller has determined the value of the potential bidder's goods or services the seller wants to acquire, through the negotiation-based valuation process.

(4) A bidder cannot bid with goods or services as (partial) payment unless the seller has extended the bidding invitation for the bidder to do so.

(5) Bidders without bidding invitations will bid with cash payment option only.

(6) A bidding invitation can be transferred to a different party by the system if doing so would close the deal involving multiple parties in a trade-based transaction. For example, if user A is listing his item in auction, and he invited user B to bid on his item. If user B also stated interest on user C's item, then user C has the bidding right of user A's item. This is because, with C winning the auction, a valid exchange circle involves A, B, and C is formed.

In one embodiment, the following rules and restrictions apply to auction-based valuation in trade-based transaction:

(1) A product can only be associated with one valuation method (e.g., fixed-price based valuation, auction-based valuation, or negotiation-based valuation). Therefore, a product on auction cannot be used to bid for or negotiate with, another product.

(2) A bid, if associated with goods or services as partial payment, can be retracted by the system if the associated goods or services have been traded in another transaction.

(3) The winning bid does not necessarily have to be the highest bid of the auction. In one embodiment, the only time this occurs is when the highest bid is associated with a trade where the cash flow (to make up the difference between goods/services sold and received) exceeds the party's cash spending limit in a trade-based transaction. See Section 3.3 for a detailed explanation. In such cases, there is no deal possible involving that party, and the winning bid associated with that party is retracted and the next highest bid is considered.

3. Transaction Types

A transaction type is characterized by the type of payment used in a transaction. The online exchange environment described herein supports these transaction types:

- (1) Cash-based Transaction
- (2) Credit-based Transaction
- (3) Trade-based Transaction

A partner in a transaction has the option to specify one or more payable and receivable methods to tailor to individual trading needs.

3.1 Cash-based Transaction

In a cash-based transaction, cash payment is used between a buyer and a seller. The online exchange environment supports cash-based transaction by letting two partners of a cash-based transaction determine the details of cash payment arrangement.

3.2 Credit-based Transaction

In a credit-based transaction, a buyer's credit account is charged with the amount that a seller's credit account is credited with. In one embodiment, each registered user is entitled to have an online trade credit card with certain credit limit. This credit limit is determined by the corresponding user's trading history (e.g., feedback rating and frequency of usage). Then, if user A after negotiation decides to buy user B's product with price P, A's trade credit account will be debited by amount P and B's trade credit account is credited by amount P. These credits can be based on the money value associated with the goods and services being exchanged, or time-spent (e.g., time-dollar in a pure non-profit service based exchange organization) for services provided. The online exchange environment supports credit-based transaction by handling the charging and crediting of credit accounts for two partners of a credit-based transaction.

3.3 Trade-based Transaction

In a trade-based transaction, two partners of a transaction exchange trade items as the main payment method to acquire each other's trade items. In one embodiment, value differences between two trade items are resolved by a cash-based or credit-based payment method. The online exchange environment supports trade-based transaction by providing a choice of valuation methods and supporting trade deal identification engine (e.g., backend deal identification engine 204) in an online environment.

The online trade deal identification process proposed herein significantly reduces the impact of, and in some cases eliminates, the restrictions of trade-based transactions described above by:

(1) Providing web based goods and services search engine (e.g., search engine 201) capable of advanced search and browsing involving locale, category, and product/service identification parameters.

(2) Providing an automated multi-party exchange deal identification engine.

An example of a system configuration for implementing operations in sale and exchange-based transactions is shown in Figure 2. The components of Figure 2 comprise processing logic that may comprise hardware (e.g., dedicated logic, circuitry, etc.), software, or a combination of both. Referring to Figure 2, the system includes a member interface 210 comprising search engine 201, a negotiation agent 202. The system also includes a backend engine 211 that includes a backend deal identification engine 204 and a backend deal recommendation engine 205. The system further includes a set of databases 212 that include a user database 206, a product database 207, an acquire preference database 208, and a transaction database 209.

In one embodiment, the operations involved for users of this service are illustrated as follows:

(1) Using the web-based search engine 201, available to everyone on the Internet, a buyer finds items available for exchange from item owners.

(2) When more descriptions are needed for an item, a buyer uses an online 'Request for Information' interface to submit questions or clarification requests to the owner, and the owner can choose to provide more information on the item in order to make the item more marketable.

(3) When a buyer identifies items to acquire, the buyer initiates the buyer's acquire preference specification by determining and accepting the value of the items through a valuation method as described in Section 2 above.

(4) The buyer then chooses a method of payment:

(4a) By cash or special credit account: the buyer is committed to the transaction, in this case a cash or credit based transaction, and the deal is immediately executable and enforced on the buyer and the seller.

(4b) By goods or services owned by the buyer: the seller is notified of the buyer's trade intention and can choose to specify an intent to acquire the buyer's items by using the valuation method associated with these items.

This completes the buyer's acquire preference specification. Unlike cash and credit based transactions that are executable and enforced immediately, trade-based transactions become executable and enforced when two or multi-party acquire preferences form a valid exchange transaction. The deal identification engine 204 periodically searches for exchange deals between online exchange users at a given moment, executes and enforces a deal if available, or makes recommendations to potential buyers in a currently open deal (via a backend recommendation engine 205), when the deal would be closed if the potential buyers are interested and willing to provide the acquire preference on the items.

In a multi-party trade, for example, three users A, B, and C can exchange goods/services among themselves. In this case, user A negotiates with a negotiation agent set up by user B to reach a $P1$ offer. Then, B negotiates with a negotiation agent set up by user C to reach a $P2$ offer. Finally, C negotiates with a negotiation agent set up by user A to reach a $P3$ offer. After A, B, and C specifying their acquire preferences, the deal identification engine 204 identifies an exchange deal among A, B, and C and inform them. Assuming $P1 > P2 > P3$, then A gets B's goods/services and pays C ($P1 - P3$), C gets A's goods/services and pays B ($P1 - P2$), and B gets C's goods/services. All A, B, and C are required to honor their commitments.

In an auction-based exchange, user A finds products posted by other users (e.g., B and C through search/browse utility) that fit his/her interests. Then A negotiates with the negotiation agents set up by B and C, respectively to determine the valuation of B and C's products (e.g., $P1$ and $P2$). Assuming that both B and C are also interested in A's products on auction, they bid against each other until the auction is closed. If B wins the auction with an offer $P3$ and $P3 > P1$, then A gets B's products and B gets A's products and pays only ($P3 - P1$).

This auction-based exchange example can be extended to cover more bidders. The auction type can be standard, reserved auction, and/or a Dutch auction for products with multiple quantities.

In a multi-party trade, if A's products are in auction and A is interested at B's products, but B is not interested in A's products but is interested in C's products. Then, C has the bidding right to bid for A's products and if C wins the auction, an exchange among A, B, and C can occur. Thus, the passing of the bidding right needs to be considered in this scenario and it differentiates itself from the traditional cash-based auction.

Each user can specify a maximum amount of cash that he/she wants to use in terms of the percentage of the total trading value. The deal identification engine 204 needs to verify this user specification and only enforce the deals that meet any specified cash spending limits. For example, if a user specifies this amount at 10% for a used computer, and the final valuation of that computer is \$300. Then, that user doesn't want to pay more than \$30 for an exchange. The deal identification engine 204 keeps this in mind and only presents the user the deal that satisfies this limit. For item listed with multiple quantities, this percentage may be per item based on the per item valuation.

If an acquire recommendation involves goods or services that are for auction-based exchange, the deal identification engine 204 extends a bidding invitation, on behalf of the owner of the items, to a potential buyer as described in Subsection 2.3 above. If an acquire recommendation involves goods or services that are for a negotiation-based exchange or a fixed-price based exchange, then the deal identification engine 204 makes recommendations to a potential buyer.

In one embodiment, exchange-based transactions, as opposed to cash-based transactions, are executable when all parties and associated goods or services form an exchange ring. To enhance exchange efficiency, a user can

specify acquire preferences for multiple parties' goods or services. The specification can involve 'either-or' and 'all-or-nothing' semantics:

(1) "Either-or" - As long as one item can be acquired in an executable exchange transaction, the deal is formed.

(2) "All-or-nothing" - When all items in the group can be acquired in an executable exchange transaction, the deal is formed; otherwise there is no deal.

3.4 Major Components

Appendix A and Figures 6-14 illustrate a comprehensive Internet web site map for an implementation of such an online exchange environment.

3.4.1 Search Engine 201

In one embodiment, search engine 201 provides a web search interface to the "Want" and "Have" goods or services database (product database 207), with parameters such as, for example: string expression for item name, description, goods or services identifier, shipping/delivery method used by the item owner for goods or services, item posted time, item available time, category/sub-category choices, and item locality.

Search engine 201 provides further search capability customization based on the user's virtual community/club membership, which is explained in detail in Sections 4 and 5 below.

3.4.2 Backend Engine 211

In one embodiment, the backend engine 211 comprises the back-end deal identification 204 and recommendation engine 205 and the front-end web interface for deal and acquire preference recommendation notification.

3.4.3 Back-End Engine

In one embodiment, the back-end engine 211 uses deal identification and acquire preference recommendation technology, operates on a snapshot of acquire preference database 208, and outputs identified deals and recommended acquire preferences.

3.4.4 Front-End Notification Interface 203

In one embodiment, front-end notification interface 203 provides a personalized web or automated email interface. For deal notifications, it provides buyer and seller information for cash or exchange-based transactions related to the user. In one embodiment, it also provides deal specific web access password for a user to access contact information of partner(s) for the goods and services in exchange. For acquire preference notifications, it provides a list of URLs for the goods and services recommended by the deal identification engine 204, along with the exchange method identifiers associated with the goods and services like auction-based exchange, negotiation-based exchange, or fixed-price based exchange.

3.4.5 Databases 212

User database 212 provides private user billing information and public user contact, shipping information.

"Have" & "Want" goods and services database, product database 207, provides active goods and services information such as, for example, name, description, category, price parameters, quantities, and availability.

Acquire preference database 208 provides outstanding acquire preference information specified by a user.

Transaction database 209 provides active and historical transaction information serving transaction execution and enforcement as well as transaction record-keeping for a given period of time.

4. Virtual Category-Based Trading Community

A distinctive characteristic of trade/exchange is category-based trade. Because usually traders expect to use as little cash as possible, they tend to trade with each other using products in the same category (e.g., ski or biking equipment). A virtual category-based trade community can be established to facilitate this growing needs.

For users who are interested in online trading for only certain categories of goods or services, the virtual category-based trading community concept extends upon the power of an advanced search engine by providing additional virtual community features fostering a closer online trader community with common interests. Also, it allows certain authoring capabilities for community members to extend their negotiation parameters (commonly as price and quantity) to better reflect the specifics of their category. For example, members can add different commonly adopted return policies for defective components in a used-computer exchange club.

A virtual category-based community provides incentive and relationship building support for users to stay with the online trading web site. In one embodiment, the virtual category-based community provides these value-add services:

(1) Bulletin Board Service (BBS) dedicated to topics related to the category;

(2) Real-time public and private chat rooms, permanent or some temporary, created by users of the communities, to discuss trading items and/or to discuss specific topics related to the category of goods or services; and

(3) Online seminar sessions, sponsored by the trading web site, with guest speakers knowledgeable in the category of goods or services, to provide an opportunity for registered users to gain access to specialists and expert advice.

In one embodiment, virtual category-based communities are open to all registered online trading users. A user can choose to join or leave a virtual category-based community at will, except for certain cases where the web site has the discretion to permanently deny a user access to a community.

5. Virtual Trading Club

During the young history of modern trade/exchange, local club based trading programs (e.g., time dollars and non-profit oriented local trading club) have become much more popular. A virtual trading club can be established to facilitate this kind of activity. A particular type of user can be an administrator to organize a virtual trading club online and register other users as members. The virtual trading club can have its own local search and swap capability with community building tools.

In addition to virtual category-based trading communities, whose memberships are open to the public and rely on the Internet etiquette and voluntary self-administration, the concept of virtual trading club provides virtual community for non-profit exchange organizations or communities desiring online presence.

In one embodiment, the virtual trading club is associated with a number of community administrators who manage membership and daily operation. Standard BBS, chat room, and seminar features of virtual category-based trading community are available to virtual trading club. However, community specific administrative and user features can be made available on a case-by-case basis depending on the service level agreement between the community and the web site. Further, trading listing fee and commission fee structures can be negotiated

and customized to suit the community need and usage pattern. The processing of web site has the discretion to change community support terms.

A non-profit exchange trading organization contacts the web site with the request for virtual trading club support. The web site works with the organization to come up with the features, agreements, and fee structures to support the community. Once the community is operative, the web site transfers administrative control of the community, with appropriate access control for the community administrators, to the mentioned organization.

6. Negotiation Set-up Process as a Tool for Building Informediary

Informediary, a short name for "information intermediary," is a type of business to help customers capture, manage, and potentially maximize the value of their personal information for commercial purposes. This information can include shopping habits, personal preferences of commercial products and services, and buying power and potential, etc.

As described in Sections 2 and 3, negotiation as a valuation method is very flexible for both buyers and sellers in a sale or exchange transaction. In one embodiment, one of the key novel aspects of this invention and business model is to allow any customers to set up their own negotiation agents with a minimum set of parameters. Then, one or more negotiation algorithms can automatically generate a negotiation agent tailored for a customer's specific needs. Those input parameters could include prices, quantities, and number of products (goods and services).

In the real world, people do not negotiate a transaction based on price and quantity alone. Other parameters may be important to the negotiation, such as seasonal demands, inventory level, after-sale services, and personal taste of the underlying goods and services, and may determine the term of a final deal. Thus, in one embodiment, a negotiation agent set-up interface includes all those personal information into consideration and tailor the automatically generated

negotiation agent to fit those characteristics. The negotiation agent building process can extrapolate a utility function that takes those parameters as inputs to compare one deal versus another. Also, the offer and counter-offer stage of the negotiation can mimic the human-to-human conversation with the consideration of those human factors in a real life negotiation. Those personal statistics can be obtained and the utility function can be estimated based on extensive surveying of each customer.

But in most of the current electronic commerce sites, customers very much resist the attempt from the Internet business to obtain their personal information, due to privacy reasons and unproven benefits. In contrary to the common practice of conducting a blind-side survey and other customer information tracking, the process for the negotiation agent to obtain those personal information in this business model helps customers to build a negotiation agent that bargains better for the pure benefit of their own gain. This information not only can help them build a better seller-side agent of their own, but also a better buyer-side agent which can automatically search for items on sale/exchange and negotiate a valuation with the seller-side agent of the specific listed item. This process of collecting personal information also is much more fun and entertaining for the customers, in which different negotiation agents with different personality traits (e.g., aggressive bargainers versus casual shoppers) and shopping profiles (e.g., buying a computer versus buying a car) can be built and tested. Thus, customers in a negotiation agent building site with an interesting and beneficial transaction model (e.g., exchange goods and services without paying excessive cash) will be inclined to give more and accurate personal information.

As discussed in Sections 4 and 5, trade-based transactions can foster much better community spirit than a pure cash transaction based environment. A trust relationship can be established between customers and this kind of web-based service, thereby allowing the site to be a stronger player in the intermediary industry.

7. Summary

In summary, this online interactive trading/exchange service provides many varieties of valuation methods and transaction types to fit the needs of buyers and sellers. It includes fixed price, negotiation, and auction based valuation methods and cash, credit, and trade based transaction types.

The novelties include, but not limited to, negotiation as a valuation method (including price, price/quantity, and multiple product price/quantity cross sales models), trade-based transaction type, and auction-based exchange model with goods/services as partial payment. This business method is extended to accommodate the building process for category-specific trading community and virtual trading clubs.

An Exemplary Network Environment

Figure 3 is a block diagram of one embodiment of a network environment 301 that may be used to facilitate the automated negotiation and trade deal identification as described herein. In one embodiment, a server computer system 300 is coupled to a wide-area network 310. Wide-area network 310 may include the Internet or other proprietary networks including, but not limited to, America On-Line™, CompuServe™, Microsoft Network™, and Prodigy™. Wide-area network 310 may include conventional network backbones, long-haul telephone lines, Internet and/or Intranet service providers, various levels of network routers, and other conventional mechanisms for routing data between computers. Using network protocols, server 300 may communicate through wide-area network 310 to client computer systems 320, 330, 340, which are possibly connected through wide-area network 310 in various ways or directly connected to server 300. For example, client 340 is connected directly to wide-area network 310 through direct or dial up telephone or other network transmission line.

Alternatively, clients 330 may be connected through wide-area network 310 using a modem pool 314. Modem pool 314 allows multiple client systems to connect with a smaller set of modems in modem pool 314 for connection through wide-area network 310. Clients 331 may also be connected directly to server 300 or be coupled to server through modem 315. In another alternative network typology, wide-area network 310 is connected to a gateway computer 312. Gateway computer 312 is used to route data to clients 320 through a local area network 316. In this manner, clients 320 can communicate with each other through local area network (LAN) 316 or with server 300 through gateway 312 and wide-area network 310. Alternatively, LAN 317 may be directly connected to server 300 and clients 321 may be connected through LAN 317.

Using one of a variety of network connection mechanisms, server computer 300 can communicate with client computers 350. In one embodiment, a server computer 300 may operate as a web server if the World-Wide Web ("WWW") portion of the Internet is used for wide area network 310. Using the HTTP protocol and the HTML coding language, such a web server may communicate across the World-Wide Web with clients 350. In this configuration, clients 350 use a client application program known as a web browser such as the Netscape™ Navigator™, the Internet Explorer™, the user interface of America On-Line™, or the web browser or HTML translator of any other conventional supplier. Using such browsers and the WorldWide Web, clients 350 may access graphical and textual data or video, audio, or tactile data provided by the web server 300.

An Exemplary Computer System

Figure 4 is a block diagram of an exemplary computer system that may be used to perform one or more of the operations described herein. Referring to Figure 4, computer system 400 may comprise an exemplary client 450 or server 400 computer system in which the features of the present invention may be implemented. Computer system 400 comprises a communication mechanism or bus 411 for communicating information, and a processor 412 coupled with bus

411 for processing information. Processor 412 includes a microprocessor, but is not limited to a microprocessor, such as Pentium™, PowerPC™, Alpha™, etc.

System 400 further comprises a random access memory (RAM), or other dynamic storage device 404 (referred to as main memory) coupled to bus 411 for storing information and instructions to be executed by processor 412. Main memory 404 also may be used for storing temporary variables or other intermediate information during execution of instructions by processor 412.

Computer system 400 also comprises a read only memory (ROM) and/or other static storage device 406 coupled to bus 411 for storing static information and instructions for processor 412, and a data storage device 407, such as a magnetic disk or optical disk and its corresponding disk drive. Data storage device 407 is coupled to bus 411 for storing information and instructions.

Computer system 400 may further be coupled to a display device 421, such as a cathode ray tube (CRT) or liquid crystal display (LCD), coupled to bus 411 for displaying information to a computer user. An alphanumeric input device 422, including alphanumeric and other keys, may also be coupled to bus 411 for communicating information and command selections to processor 412. An additional user input device is cursor control 423, such as a mouse, trackball, trackpad, stylus, or cursor direction keys, coupled to bus 411 for communicating direction information and command selections to processor 412, and for controlling cursor movement on display 421.

Another device which may be coupled to bus 411 is hard copy device 424, which may be used for printing instructions, data, or other information on a medium such as paper, film, or similar types of media. Furthermore, a sound recording and playback device, such as a speaker and/or microphone may optionally be coupled to bus 411 for audio interfacing with computer system 400. Note that any or all of the components of system 400 and associated hardware may be used in the present invention. However, it can be appreciated that other configurations of the computer system may include some or all of the devices.

Appendix A: One Implementation of the Online Exchange Environment

(Note: indentation illustrates parent/child component /web page relationship)

Web Front-end (site map)

- User interface design

- Visual representation

Database

- Relational database schema diagram

- SQL query / report generation

- Concurrent read/write

- Database replication and consolidation

- User database

- Product database ("Have" ads)

- Product database ("Want" ads)

- Preference relation database

- Deal database

- pending deals

- fee collections

- Deal history database

- Category database

- Virtual club/community database

- Deal recommendation database

- primary keys and secondary keys configuration

Credit Card Processing

- Secure information entry and processing

- credit and debit management

- insertion/transaction fees

- credit-based transaction

- Identity verification

- Over-use protection/warning

User Profile and Management

Authentication of identity (new user registration)

Authentication of login (existing user login time)

View Personal Account

Products on sale

Products bid / preference on record

Products committed

during ad time

off ad due to expiration

Balance of Credit and Debt

Regular credit card

trade dollar card

View Personal Profile

Name

Address

Credit card information

All other user profile information

Registration profile

subscription

insertion/transaction fee based structure

Association (virtual club/community) affiliation

Access control

Login

age-based category

User reputation/rating system

User penalty / membership revoke management

Frequent trader incentives

cash on regular credit card

trade dollar

User credit management

assessment

tracking

billing

regular credit card credit/debit

trade dollar card credit/debit

Reporting

Monthly Billing Summary

online

paper-based

Real-time Preference/Transaction confirmation/enforcement

Real-time insertion/completion fee confirmation

Statistical analysis support

Online bill presentment

Communication

Standard Email support

customer-to-customer

customer-to-web site

Online feedback form interface

Web site-to-customer

virus issues

neighborhood watch program

Web chat/BBS services

personal

private

public

User feedback for reputation rating

Email notification (OR personal web-based message box)

User Identification/Password notification after verification

deal recommendations

deal identifications

Editorial Documentation**User's Guide****Search Help****FAQ****Product Setup****Trading****Closing****Dispute****Warning (dealing offline penalty and prevention)****Rating****User rating****Frequent user rating****HTML Guideline / TAG / Image****Purchase Preference Interface (including Auction results tally)****Preference database update****Preference confirmation****Auction results tally (winner identification)****Product listing and management****Trader product listing****Club-owner product listing****Product information update/removal****Search engine ('Search-by' criteria)****Category****Location****Association(s)****Trader Rating****Price (+ Quantity)****valuation method****General search string****"sort-by" capability before/after list generation**

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Group select-then-display feature

simple search

binary search

advanced search

Browse engine (similar 'Browse-by' criteria)

Product Detail

Information of dealing history

Product description

Action screen for valuation

Product setup wizard

goods/services

title

keywords

description

image

access control parameter

negotiation agent parameters

price

price and quantity

multiple product cross-selling

Web site system administrator management

Automatic product listing removal (after expiration date)

Illegal / inappropriate product removal

Registration rights removal

Financial penalty on credit

Warning messages delivery

Virtual club/community administration support

authoring capability

Club user login/password assignment/administration

Interface for varying negotiation, trade, and bidding logic

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Administration of special local currency

Club specific chatting and BBS

Multi-party deal identification algorithm

Deal identification

Deal recommendation

Inheritance of bidding rights for auctions

Business-to-business (and business-to-customer) interface/fulfillment

Franchise

Partnership/Associate program (with store owner identity) for listing

Automatic listing update/database integration for partners

Web hosting administration

Site security/intrusion detection

Firewall

System administration

Data integrity/backup

Server/network redundancy

Customer Protection Programs

Escrow

Technical Support

Insurance policy for fraud related issues

Client certificate for certain users

3rd-party Ad Display Engine

Traffic and demographic information

Ad banner area

Ad display interval

Ad revenue structure

User Test Drive

setup procedure (with fixed parameters)

context sensitive pop-up helps

usage of negotiation agent

Negotiation Engine

- core algorithm for specified utility function

- price

- price and quantity

- multiple products (price and/or quantity)

- one negotiation session per user verification

- all boundary condition check

- GUI interface for negotiation agent

- backend scripting and database interface

Fixed price update (bypass negotiation agent)

- specify preferences with a fixed price from two parties

- verification of approval from both parties

Auction Engine**Rule**

- immediate fulfillment before deadline

- no concurrent auction and negotiation

Bidder disappearance

- FAQ for owner

- auction bidding might show qualified bids but possible no deal

- monetary based

- owners select goods and pre-negotiate and invite

- web site invites in the case of multi-party deals

Marketing/Promotion Engine

- frequent-user credit program (reward)

- multi-level marketing scheme for referral

- mailing list for web site newsletter

Whereas many alterations and modifications of the present invention will no doubt become apparent to a person of ordinary skill in the art after having

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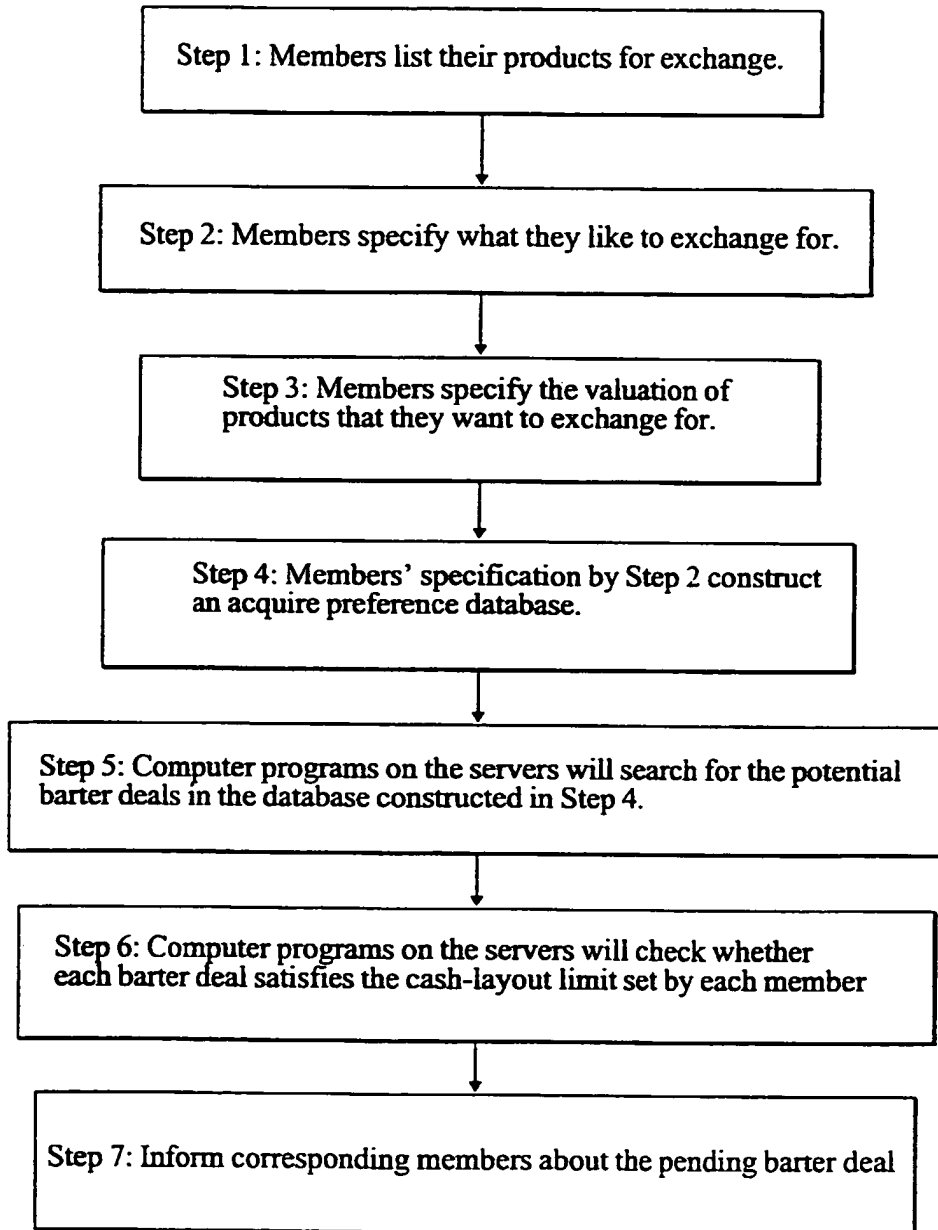
read the foregoing description, it is to be understood that any particular embodiment shown and described by way of illustration is in no way intended to be considered limiting. Therefore, references to details of various embodiments are not intended to limit the scope of the claims which in themselves recite only those features regarded as essential to the invention.

CLAIMS

We claim:

1. A method comprising:
an automated negotiation in an on-line environment is described. In one embodiment, the method comprises an automated negotiation agent receiving, over a networked environment, an indication of a product to be acquired for an individual; and
the automated negotiation agent negotiating for the product over the networked environment on behalf of the individual; and
completing a transaction as a result of the negotiation of the automated negotiation agent.
2. The method defined in Claim 1 wherein the transaction comprises a bartered exchange.

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Flow Chart for Trade-Based Transaction Method**FIG. 1**

Block Diagram for System Implementation

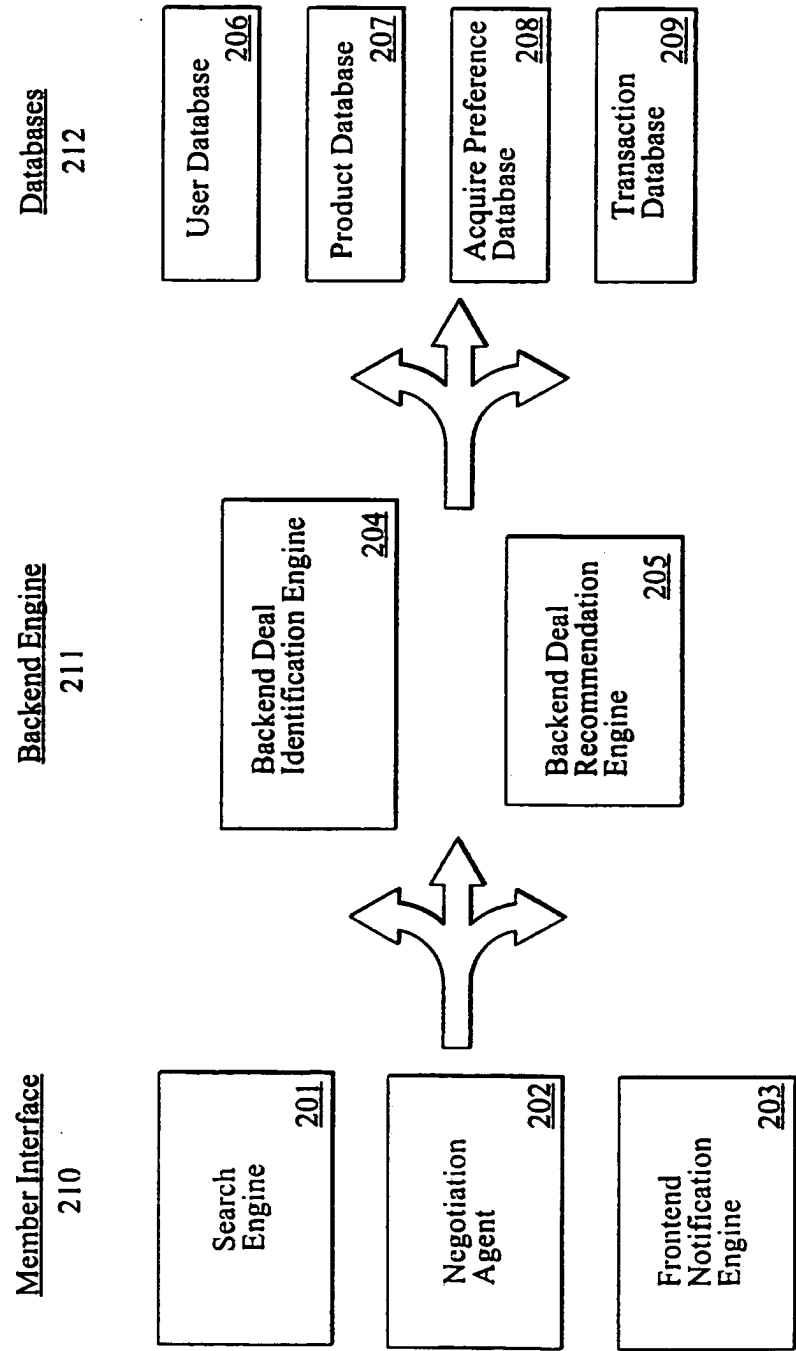


FIG. 2

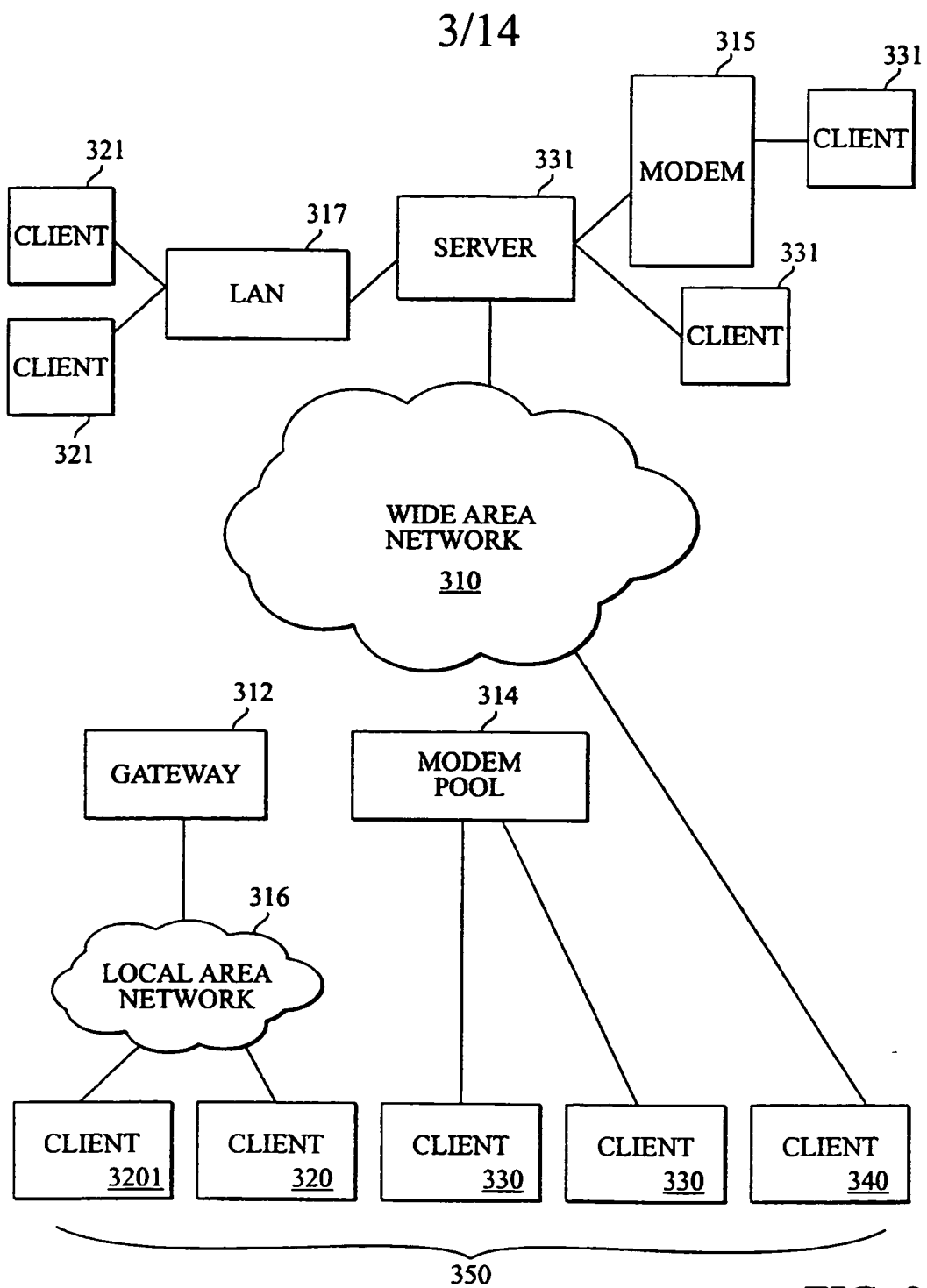


FIG. 3

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400

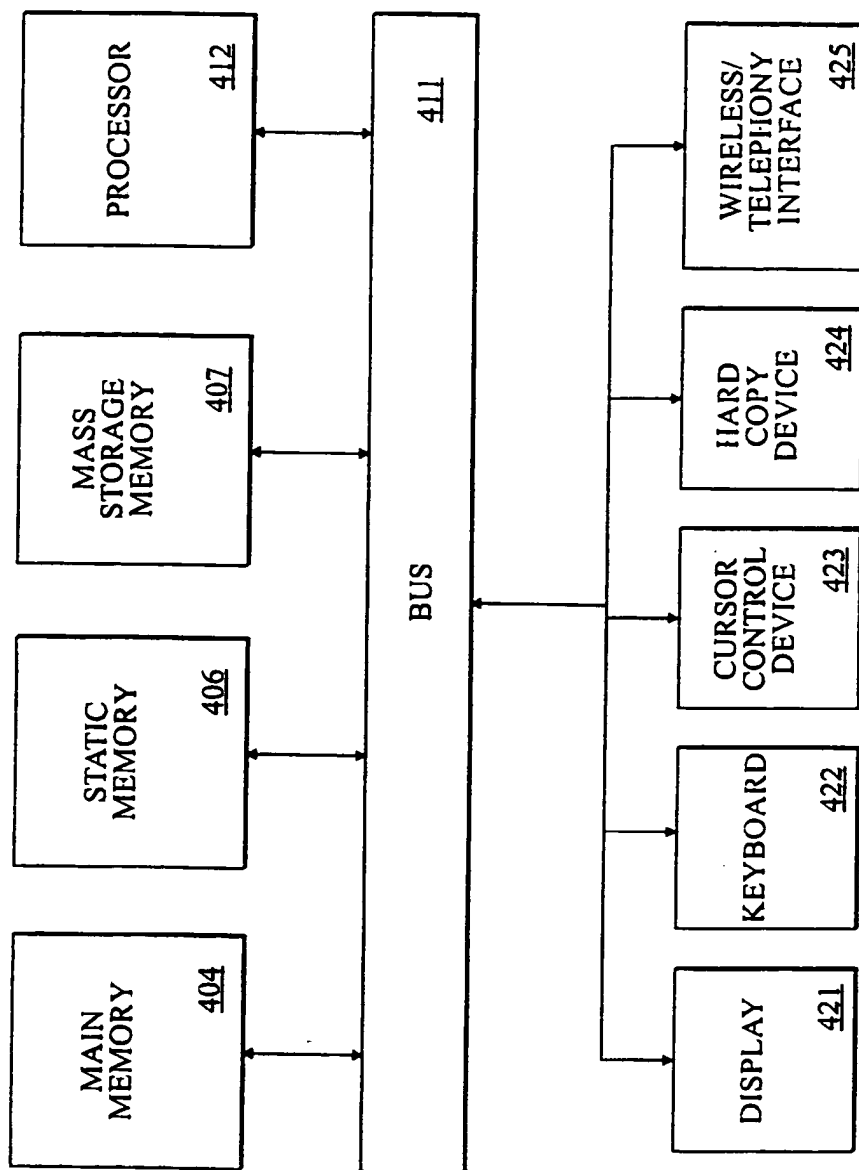


FIG. 4

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☐
☐
☐
Add Item to Listing

Please read Listing Policy before you add an item.

Title:

Please select a category

Category: Description:

Image URL:

City: Location:State: ZIP Code: ValuationMethod:☒ Fixed Price ☐ Negotiation/Sealed BidOfferingPrice:\$ /units#UnitsAvailable: unitsBottom Line

(required if you accept Negotiation/Sealed Bid)

Price:\$ /unit if purchase 1 unit only\$ /unit if purchase all units"Unit"Means:

optional, e.g. "table & 4 chairs", "3 hours/week" etc.)

ShippingPaid By:☐ Sender ☐ Receiver ☐ Other (see Description), or N/A☐ Money order / Cashier ChecksPaymentMethods:☐ Personal Check☐ COD☐ Visa / Mastercard☐ American Express☐ Discover☐ Other(see Description)

FIG. 5

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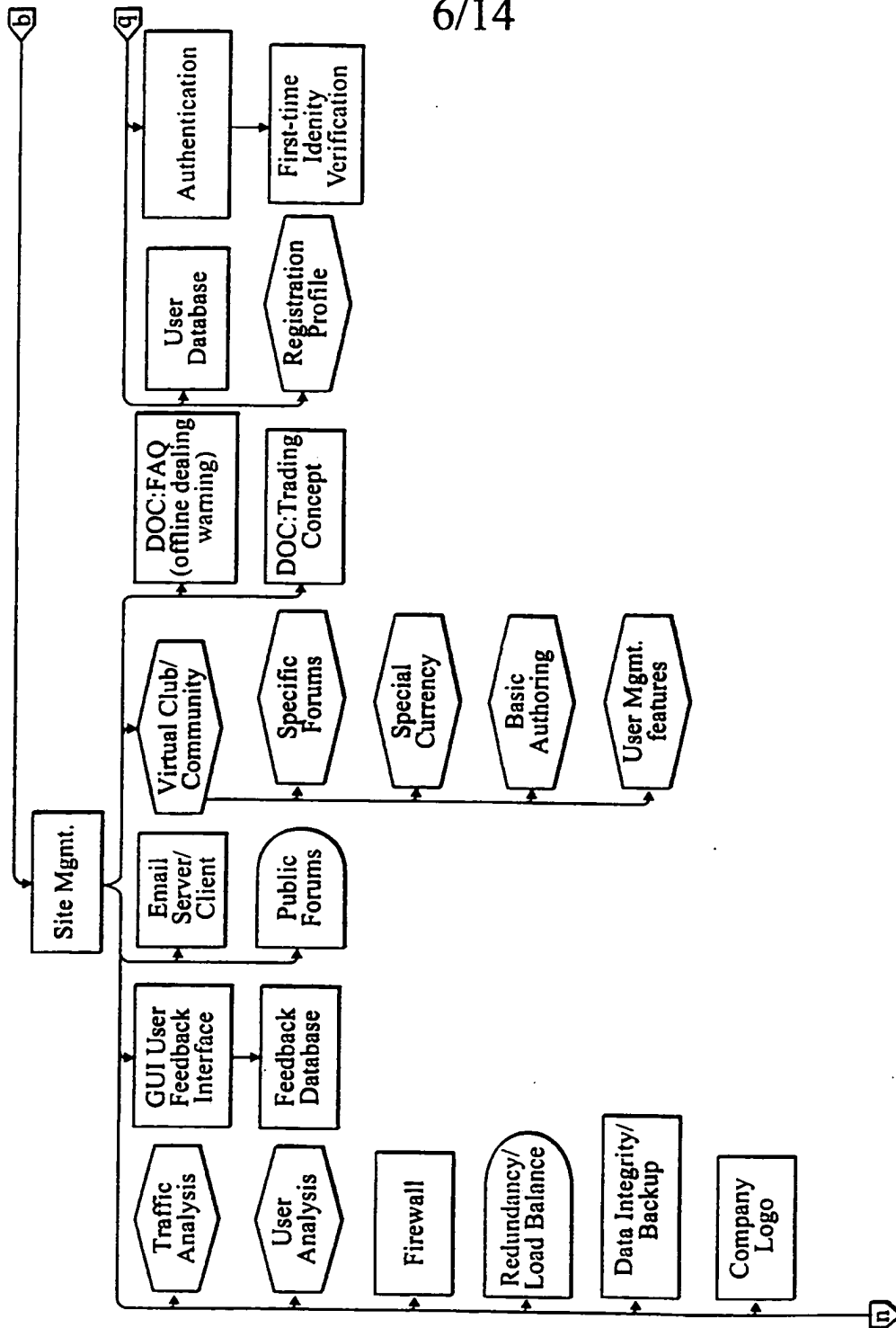


Fig. 6

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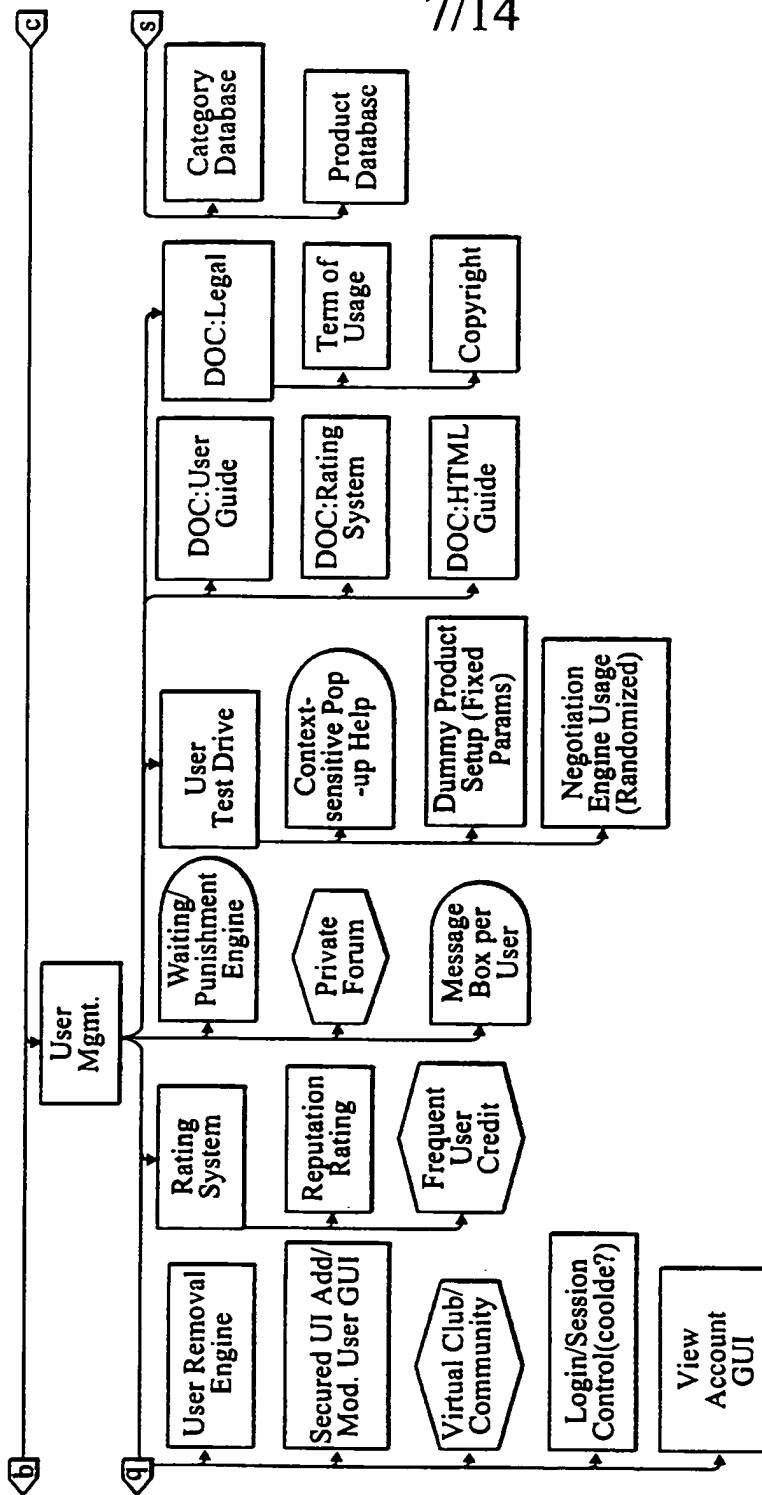


Fig. 7

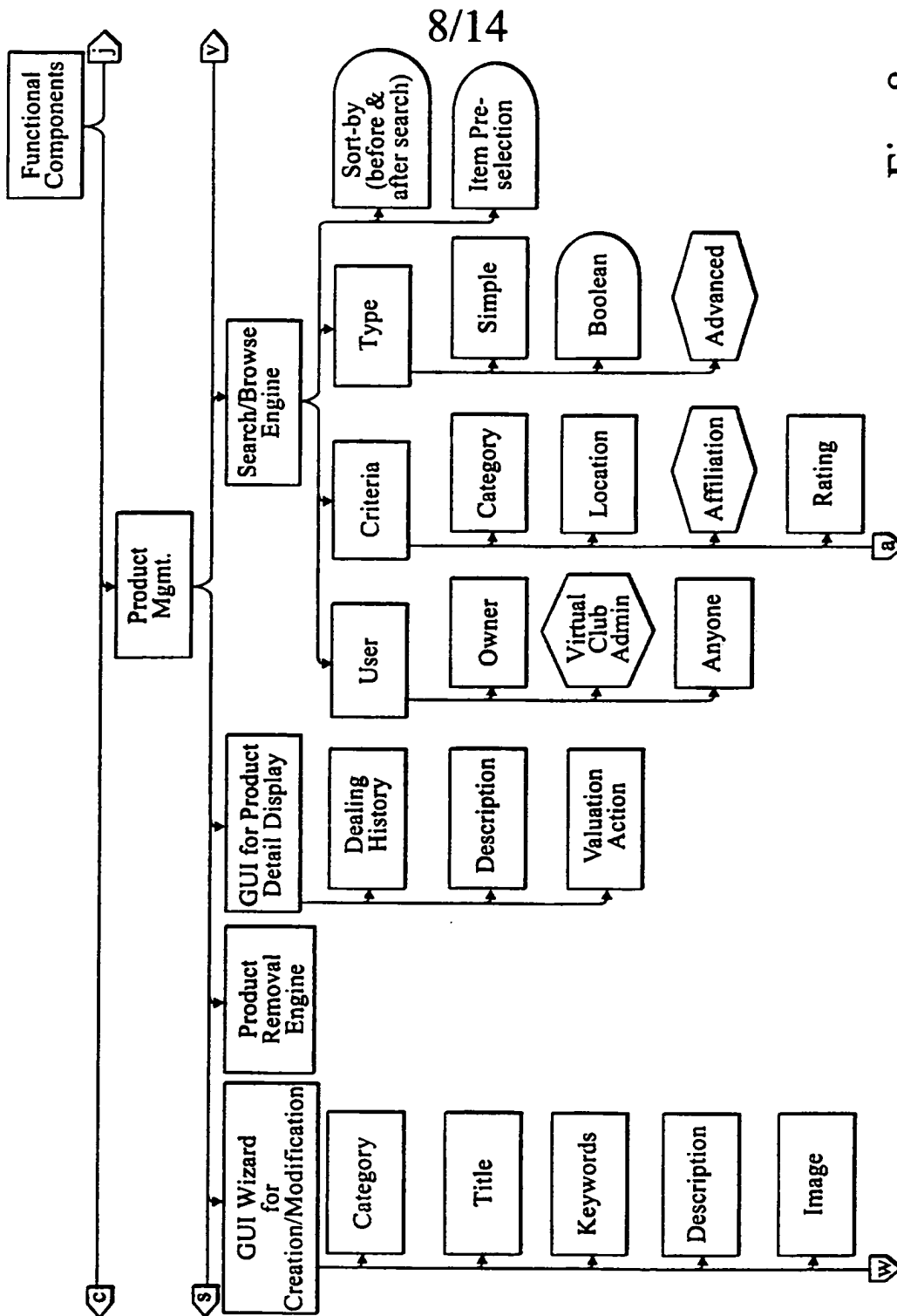


Fig. 8

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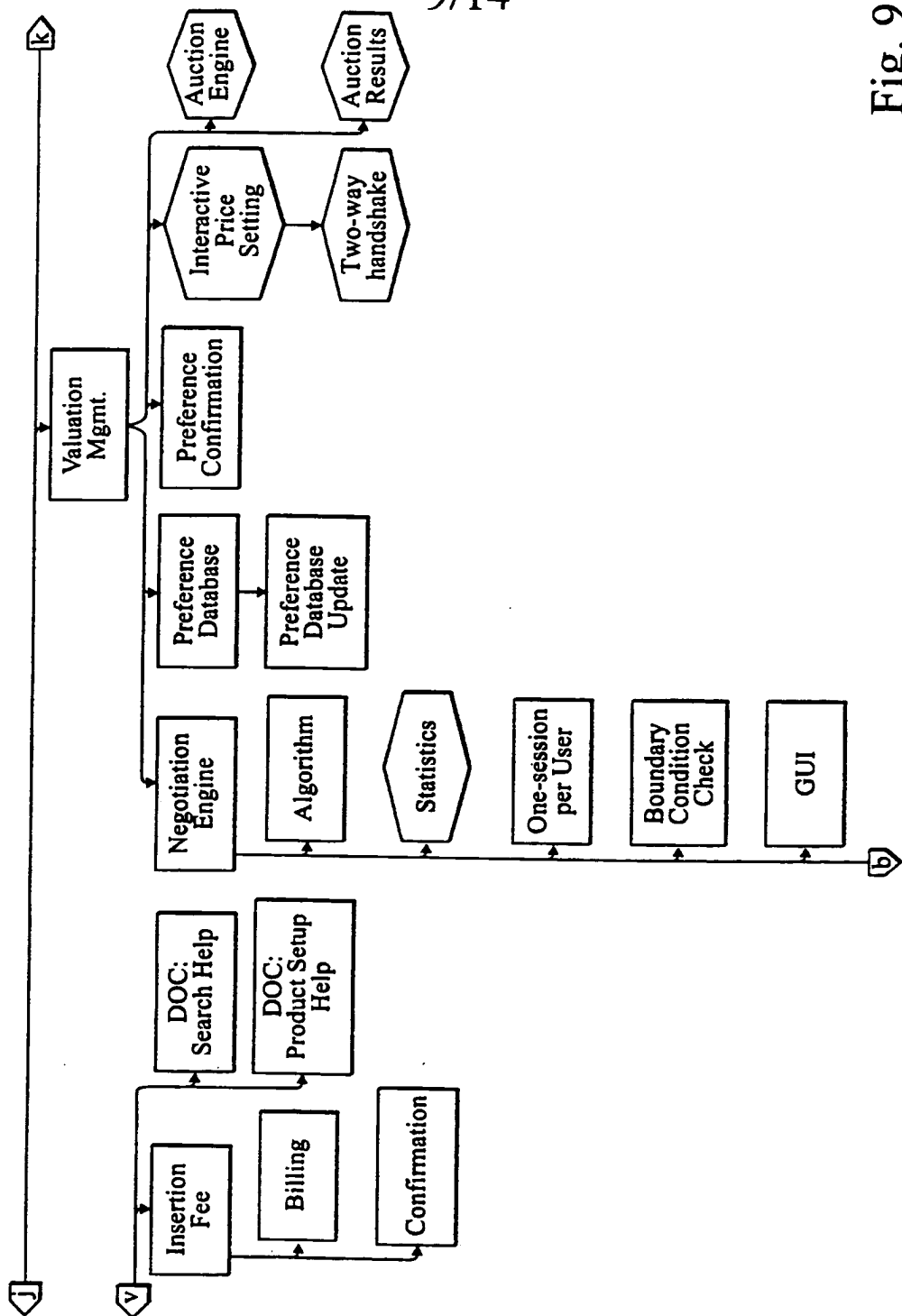


Fig. 9

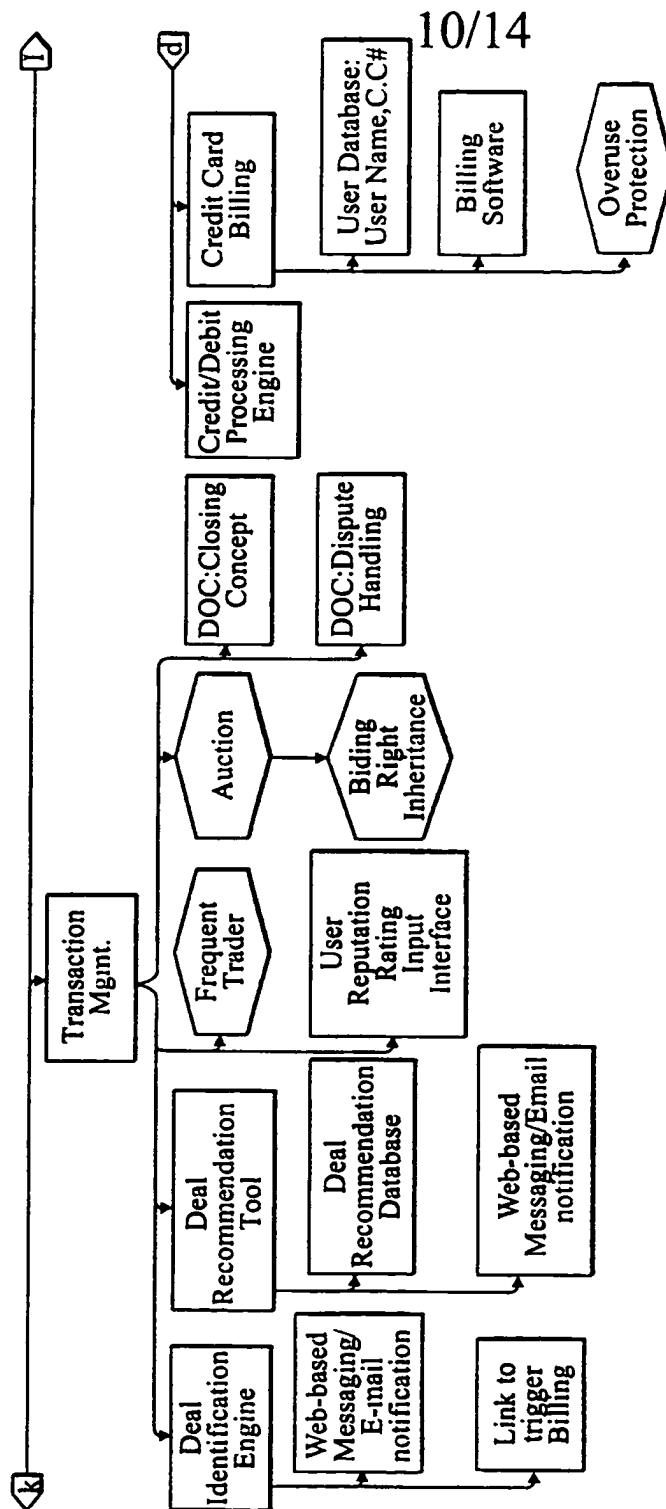


Fig. 10

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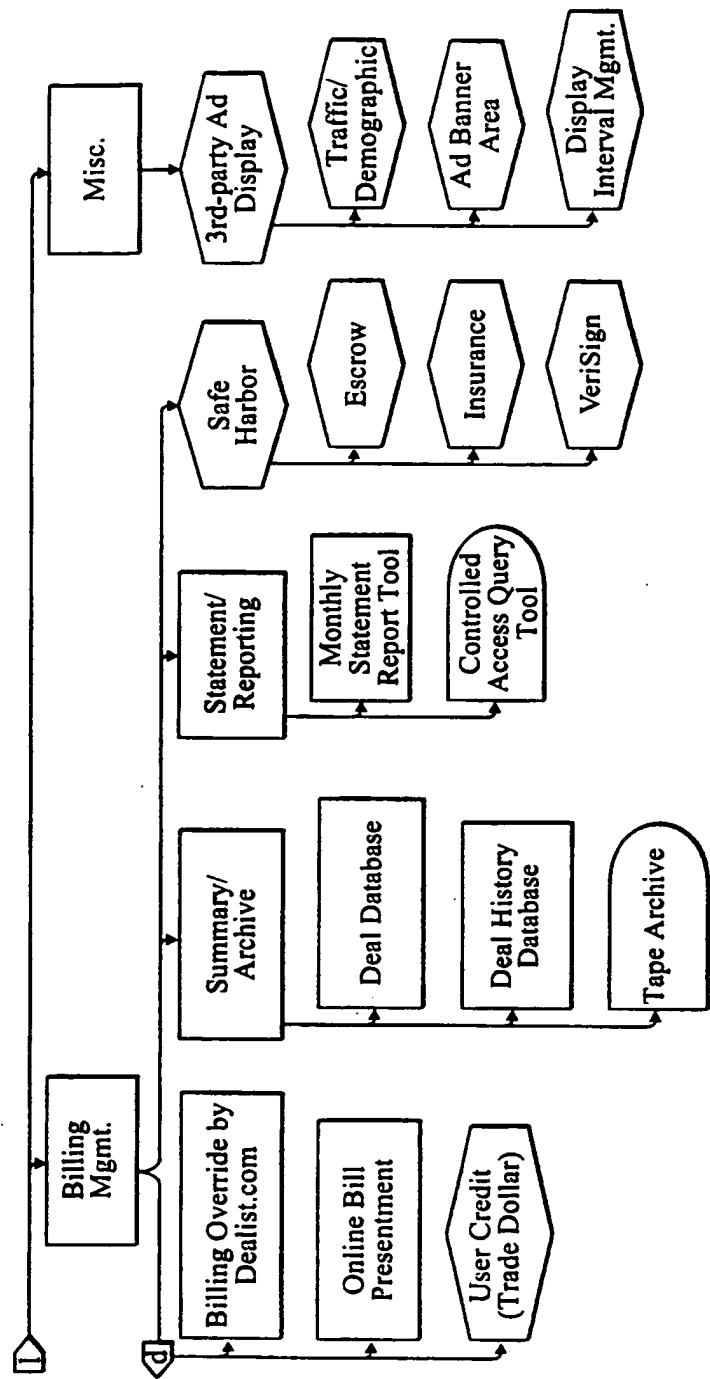
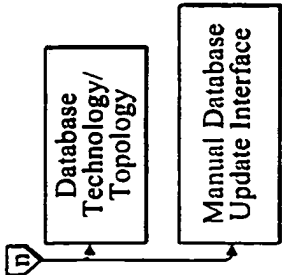


Fig. 11

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Fig. 12



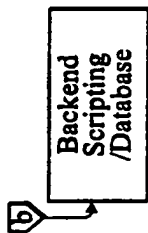
13/14

Fig. 13



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Fig. 14



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/26845

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :G06F 17/60
US CL :705/37, 36, 26

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/37, 36, 26

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WEST, DIALOG

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,873,071 A (FERSTENBERG et al) 16 February 1999, col. 12, line 36 thru col. 17, line 24.	1-2
X	US 5,862,325 A (REED et al) 19 January 1999, col. 5, line 57 thru col. 9, line 50, col. 123, lines 9-15.	1-2
X,P	US 6,058,379 A (ODOM et al) 02 May 2000, col. 9, line 30 thru col. 13, line 54.	1-2
X,P	US 6,119,101 A (PECKOVER) 12 September 2000, col. 14, line 56 thru col. 16, line 48.	1-2
A,P	US 6,029,195 A (HERZ) 22 February 2000, entire document.	1-2

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*A* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

04 DECEMBER 2000

Date of mailing of the international search report

02 JAN 2001

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Facsimile No. (703) 305-3230

Authorized officer

VINCENT MILNE

Telephone No.

James R. Matthews
(703) 308-1065